

Revisions / Errata for Water Measurement Manual

- These changes were made in the 2001 REVISED REPRINT.
- Web page addresses were updated in this electronic version in 2003 after corporate reassignment of USBR web site names).

Page	Original text	Change To...
Title page		Add reference to the Water Measurement Manual web page on title page or other appropriate location. The URL is: www.usbr.gov/pmts/hydraulics_lab/pubs/wmm/
iv	...can be referred to for size selection and setting the crest elevation .	Correct typesetting blotches affecting the words “ setting ” and “ crest ”
iv	Last paragraph on page	Before the sentence beginning “Tony Wahl compiled...” insert the sentence “Dave Rogers wrote the section on radial gate flow measurements and the use of the RADGAT computer program.”
iv	End of last paragraph on page	After the sentence acknowledging Tom Hovland and Teri Manross, add this sentence: “ Jim Higgs created the online version of the manual, which is available at www.usbr.gov/pmts/hydraulics_lab/pubs/wmm/ ”
xiii	Caption on Table 8-2	Long-throated flume sizes and discharge ranges for lined trapezoidal canals
xiii	Caption on Table 8-3	Rating equation parameters and ranges of application for flat-crested, long-throated flumes in lined trapezoidal canals
xiii	Caption on Table 8-4	Rating equation parameters and ranges of application for flat-crested, long-throated flumes with rectangular throat sections
2-11	The bottom dimension line of E_2 extends to the bottom of the channel. It should extend to the bottom of h_2 .	Correct figure 2-3c (New figure provided)
2-15	When the Froude number is 1 or greater ,...	Delete the words “ or greater ”
3-14	First sentence of paragraph beginning in middle of page “...for C_d in equation 3-5 from the previous example...”	“...for C_d in equation 3-6 from the previous example...”
5-15	Figure 5-10	Add (a) and (b) tags to top and bottom half of figure, respectively. These references are already used in the text.
7-6	4 th paragraph, last sentence, reference to “ Skogerbee et al.”	change to “ Skogerboe et al.”
7-7	End of first paragraph in section 5 “...are necessary for accurate measurement of flow:”	“...are necessary for accurate measurement of flow (see also, Fig. 5-2):”
7-24	First paragraph “...cut into rectangular notches 2, 4, and 6 ft wide (Villemonthe, 1947)”	Change to “...cut into rectangular notches 2, 4, and 6 ft wide to produce horizontal extensions of $L=0$, $L=2$, and $L=4$ ft, respectively (Bergmann, 1963) ”
7-24	Insert new text after equation 7-8 and before “Further testing is needed...”	“ When h_1 is 1 ft or less, the flow is confined to only the V-notch portion of the weir and equation 7-6 is used. ”
7-35	Figure and equation references.	See marked-up page.
7-41	First sentence at top of page is wrong.	Replace first sentence with “Frequently, suppressed weirs deliver much more water than operators believe they have measured.”
7-43	Bergmann reference	Delete the word “(unpublished),”
7-44	Last reference	Proper spelling is “ Wahlin ”, not “Whalin”

Page	Original text	Change To...
8-23	First paragraph in section (e). "...are presented in Bos et al. (1991)."	"...are presented in Clemmens et al. (2001) and Bos et al. (1991). "
8-23	First paragraph in section (e). "...U.S. Department of Agriculture, developed computer programs..."	"...U.S. Department of Agriculture, developed the first computer programs..."
8-23	Paragraph beginning "Bos et al. (1991) provides calibration tables..."	"Clemmens et al. (2001) and Bos et al. (1991) provide calibration tables..."
8-23	Completely replace paragraph beginning "Clemmens et al. (1993) provide personal computer software..."	WinFlume (Wahl et al. 2000) is the most advanced software for analysis of long-throated flumes. The program is Windows-based and can be downloaded from http://www.usbr.gov/pmts/hydraulics_lab/winflume/ . Ratings are determined by numerical solution of the critical-flow equations, accounting for boundary friction and other losses. The program includes a module that simplifies and accelerates the process of developing acceptable flume designs.
8-24	at top of page "...a computer program equivalent to that provided by Clemmens et al. (1993)."	"...the WinFlume computer program (http://www.usbr.gov/pmts/hydraulics_lab/winflume/)."
8-24	Last paragraph on page, first sentence	The calibration equations were developed from discharge tables computed with WinFlume and its predecessors (Clemmens et al., 1987 and 1993).
8-25	Replace table 8-2	New table provided
8-26	Replace table 8-3	New table provided
8-27	Replace table 8-4	New table provided
8-28	Replace table 8-5	New table provided
8-34	<u>first paragraph at top of page</u> "The full length structure of figure 8-6..."	<u>Replace entire paragraph with the following:</u> "The full-length structure of figure 8-6 can be simplified by deleting the diverging transition (downstream ramp) or the entire extended rectangular tailwater channel. These changes will increase the head loss across the structure and force energy dissipation to take place within the earthen canal section. The extended tailwater section of the structure may be deleted only if adequate riprap is provided and if the Froude number in the tailwater channel is less than 1.7 at maximum flow (Bos et al. 1991)."
8-35	<u>last paragraph at bottom of page</u> "(3) The modular or submergence limits should be checked..."	<u>Replace entire paragraph with the following:</u> "(3) Sufficient head loss should be available across the structure at all flow rates. If there is an abrupt expansion (no downstream ramp) into a rectangular channel the same width as the crest, the head loss should be the greater of $0.1H_1$ or the value shown in table 8-4. If the downstream channel is wider than the crest, the head loss should be at least $0.4H_1$."
8-36	<u>last sentence at bottom of page</u> "The designer could use the head loss value for the discharge into a lake or pool, $\geq H_1$ of $0.4H_1$. "	"The designer should use the head loss value for the discharge into a lake or pool, $\geq H_1$ of $0.4H_1$. "
8-44	The column labeled " F "	should be labeled " T " (there is no "F" dimension on the figure on the preceding page)

Page	Original text	Change To...
8-62	Add new reference, and move Cheremisinoff up (it is out of alphabetical order). The new reference is being added because the Bos et al. 1991 book will soon be out of print, if not already.	Clemmens, A.J., T.L. Wahl, M.G. Bos, and J.A. Replogle, <i>Water Measurement with Flumes and Weirs</i> , ILRI Publication 58, International Institute for Land Reclamation and Improvement, PO Box 45, 6700 AA Wageningen, The Netherlands, 2001.
8-63	Add this reference before Wells and Gotaas...	Wahl, T.L., A.J. Clemmens, J.A. Replogle, and M.G. Bos, "WinFlume — Windows-Based Software for the Design of Long-Throated Measuring Flumes". Fourth Decennial National Irrigation Symposium, American Society of Agricultural Engineers, Nov. 14-16, 2000, Phoenix, AZ. http://www.usbr.gov/pmts/hydraulics_lab/winflume/
10-29 and 10-30	Top halves of figures 10-16a and 10-16b	Change d_1, d_2, d_3, d_4, d_5 , to D_1, D_2, D_3, D_4, D_5 (New figures provided)
Con-1 thru Con-3	Replace with new pages...there were many errors, changes, and duplications. The two separate conversion factors tables have been merged into one, occupying the same total number of pages.	
Ind-3	bottom of page "cutthroat flume (Montana flume)...8-42"	Delete "(Montana flume)"

New Revisions / Errata

These errors and changes have been identified since the 2001 reprint. The changes have been made in this electronic version.

Page	Original text	Change To...
9-26 Figure 9-10	A = Nominal area of pipe entrance, ft^3/s	A = Nominal area of pipe entrance, ft^2